

EC type-examination certificate

UK/0126/0176

Issued by:

The National Measurement Office
Notified Body Number 0126

In accordance with the requirements of the Measuring Instruments (Automatic Catchweighers) Regulations 2006 (SI 2006/1257) and the Measuring Instruments (Non-Prescribed Instruments) Regulations 2006 which implement, in the United Kingdom, Council Directive 2004/22/EC, this EC type-examination certificate has been issued to:

RDS Technology Ltd
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GL6 9BH
United Kingdom

In respect of a vehicle-mounted automatic catchweighing instrument designated the Loadmaster Alpha 100 and having the following characteristics:

Maximum capacity	: Max	\leq	50,000 kg
Minimum capacity	: Min	\geq	10 e
Scale interval	: e	\geq	10 kg
Number of scale intervals	: n	\leq	250
Accuracy Class	: Y(b)		

The necessary data (principal characteristics, alterations, securing, functioning etc) for identification purposes and conditions (when applicable) are set out in the descriptive annex to this certificate.

Issue Date: 19 September 2014
Valid Until: 18 September 2024
Reference No: TS0101/0028



Signatory: P R Dixon
for Chief Executive



Descriptive Annex

1 INTRODUCTION

This pattern of a battery-operated automatic catchweighing instrument, designated the Loadmaster Alpha 100, comprises a weighing module, "Terminator" junction box, Head unit" control and display module, pressure transducers and sensors mounted on a wheeled loader (Figure 1). This pattern automatically determines the load in the bucket during the lifting process, the hydraulic pressure in the loader's arms is converted by a pressure transducer, the output being used by the indicator to display the corresponding weight.

2 FUNCTIONAL DESCRIPTION

2.1 Mechanical

Figure 2 shows the system overview for a typical configuration.

2.1.1 Pressure transducers

The sensors measure the difference of the pressures acting on both sides of the piston in the lift cylinder(s).

The pressure transducers are two pressure sensors type 1250 manufactured by Danfoss, equipped with strain gauges, connected to the electronic indicator, which indicates the load in terms of mass.

2.1.2 Boom Inclinometer

The correct position for a weight determination is when the loading arm is passing within a weighing zone. After passing the end of the weighing zone, the display indicates the weight value. The direction of travel of the loading arm is established by the signal change.

2.1.3 Bucket sensor

This sensor is used to ensure that the weighing sample only occurs when the attachment (bucket or other load receptor) is in the correct weighing position.

2.1.4 Boom sensor (Telescopic Loaders Only)

This sensor is used to ensure that the weighing sample only occurs when the telescopic boom is in the correct weighing position on a telescopic loader.

2.1.5 Temperature sensor

This sensor is clamped to the outside of the pipe from the hydraulic control valve, connected to the main lift cylinder(s). This sensor will inhibit the system from working until the hydraulic oil has reached the correct operating temperature.

2.1.6 Chassis inclinometer

The chassis inclinometer is a dual-axis angle sensor installed on the chassis, and will compensate the weight readings if the instrument is tilted to an angle of less than x degrees longitudinally and y degrees transversally, with x and y not exceeding 10 and 5 degrees respectively.

The inclinometer will inhibit the weight readings for tilt angles exceeding x and y degrees.

The values of x and y shall be determined at initial verification (based on the tilt angles tested), and protected by the sealing measures described in section 3.3.

2.1.7 Weighing module

The weighing module is located on the chassis and houses all the terminations for the transducers and sensors. It converts the transducers and sensors inputs into a digital weight indication sent to the “Terminator” junction box via CAN bus.

2.1.8 Junction box

The “Terminator” junction box is located in the cabin and houses all the terminations for the battery, weighing module, Head unit control and display module and peripheral devices

2.1.9 Head unit control and display module (Isocan)

The head unit is located in the cabin and is mounted to the loader's inner frame. It provides the user interface and comprises a touch screen, hard and soft keys and an SD Card slot. A typical head unit is shown in Figure 3. The legally relevant information shall include the captured weight, target weight, total weight, zero indicator and unit of measurement. The semi-automatic zero and tare keys (when the preset tare device is enabled) shall be available via the user menus if not shown on the main screen. Figure 4 shows the main screen display with the legally relevant information.

Any CE-marked hardware may be used, provided it meets the following minimum hardware requirements to ensure the legally relevant software and displayed information remain in compliance with this certificate:

OS	Windows CE
Processor	400 Mhz
RAM	64 MB
HD	128 MB
Screen resolution	800 x 480 pixels

2.2 Electrical

The system operates from 11-30 V DC, supplied from the vehicle battery (12 or 24V DC). The Weighing Module is fitted with Flash Memory. Failure of the Flash Memory causes the system to reset and inhibit any further use of the system.

2.3 Devices

2.3.1 On power up the display shows a start up screen with the following information:

- RDS
- LOADMASTER α100

2.3.2 The instrument is fitted with a (dynamic) semi-automatic zero-setting. Loads that are outside of the zero capture range ($\pm 2\%$ Max) produce a visible and audible warning. The “Check Zero” prompt will be displayed on the screen if the system has been switched off or has not recognised any lifts for more than 15 minutes. A visible warning is shown until the load bucket has been raised and lowered 1 time and the zero has been set. The zero-setting must be repeated every 15 minutes.

2.3.3 The instrument is fitted with a zero indicator, a “>0<” symbol is displayed when the weight indication is within 0.25e.

2.3.4 Loads over Max +9e and unsteady weights produce a visible and audible warning. At overload the weight value is replaced by an overload symbol. When the weight is unsteady a warning symbol is shown and ““Lift too bouncy” is displayed. Loads below zero will be displayed but will not be added to the total load and will not be printed.

2.3.5 The instrument may be fitted with a preset tare device. Preset tare weights are entered manually via the keypad. The display indicates the preset tare value, followed by the symbol PT. The tare weights are summated on the printout or data storage and identified as Total PT. The net weight indication is identified by NET on the display and printout.

2.3.6 The Head unit is fitted with an SD Card on which the weighing data is automatically recorded (SQL Server Compact database). The weighing data is stored in a secure file (DBIS) that can later be exported for processing. The weighing data shall include all information necessary to identify the measurement (date/time, product weight, preset tare weight, unit of measurement, unique number, instrument ID).

2.3.7 A thermal printer may be connected to the head unit allowing load tickets to be printed automatically or by manual command. The information on the printout shall be in conformity with National Regulations.

3 TECHNICAL DATA

3.1 The system has the following technical characteristics:

Maximum capacity (Max)	≤ 50,000 kg
Scale interval (e =)	≥ 10 kg
Minimum capacity (Min)	≥ 10 e
Maximum number of scale intervals	250
Pressure transducer	Danfoss type MBS 1250
Transducer measuring range	0...250 bar or 0...400 bar
Transducer output signal	4-20 mA
Minimum sensitivity	35 µV/div
Climatic environment	-25 °C to +50 °C Closed, non-condensing,: Head unit, printer Open, condensing: Weighing module, junction box, transducers, sensors
Electromagnetic environment	E3
Power supply	11-30 V DC (12 V and 24 V vehicle batteries)
Accuracy class	Y(b)

3.2 Documentation and drawings

Installation Manual	S/DC/500-10-719
Calibration Manual	S/DC/500-10-720
User Manual	S/DC/500-10-721
Junction box circuit diagram	P585-2014 Issue 03
Weighing module dimensional drawing	HU406-1-001
Weighing module circuit diagram	P585-211 Issue 03

Temperature sensor	S/SR/268-8-015
Bucket sensor	S/SR/268-8-017
Temperature sensor	S/SR/268-8-015
Pressure transducer 250 bar	S/SR/500-2-085
Pressure transducer 400 bar	S/SR/500-2-087

3.3 Software

3.3.1 Weighing module

The complete software is legally relevant, and can only be changed by breaking the seal described in section 6.3.

The Weighing module software complies with Welmec Guide 7.2 Issue 5, Risk Class B, Type P, no Extensions.

3.3.2 Head unit (Isocan and Database)

The Isocan and Database software is held on the SD Card. Access to the software is password-protected, a non-editable counter designated “Calibration counter” increments when the software is changed.

The legally relevant parameters are held on the SD Card and password-protected, the “calibration counter” increments when any of the parameters are changed.

The value of the “Calibration counter” can be displayed in the USER menu in “Event trail” (Figure 5).

The legally relevant software and parameters on the SD Card are synchronised with the Weighing Module via the CAN, ensuring the Isocan and Weighing Module can only work as a pair once the system is sealed. In the event of a display failure the SD Card can be transferred into a new display, taking with it the original data and calibration values.

The Isocan and Database software comply with Welmec Guide 7.2 Issue 5, Risk Class B, Type U, Extensions L and S.

3.3.3 Software identification

The legally relevant software identification shall be as follows:

Software type	Designation	Version number
Weighing module	LX100	003
Isocan	IS100	005
Database	DBIS100	003

The software identification can be displayed in the USER menu in “About System” (Figure 6).

All other software modules are non-legally relevant and may be freely modified.

4 PERIPHERAL DEVICES AND INTERFACES

4.1 Interfaces

The instrument may be fitted with the following interfaces:

- RS232
- Ethernet
- CAN 2

4.2 Peripheral devices

The instrument may be connected to any peripheral device that has been issued with an Evaluation Certificate or Parts Certificate by a Notified Body responsible for Annex B (MI-006) under Directive 2004/22/EC in any Member State and bears the CE marking of conformity to the relevant directives; or

A peripheral device without an Evaluation Certificate or Parts Certificate may be connected under the following conditions:

- it bears the CE marking for conformity to the EMC Directive;
- it is not capable of transmitting any data or instruction into the weighing instrument, other than to release a printout, checking for correct data transmission or validation;
- it prints weighing results and other data as received from the weighing instrument without any modification or further processing; and
- it complies with the applicable requirements of Paragraph 8.1 of Annex I.

5 APPROVAL CONDITIONS

The certificate is issued subject to the following conditions:

5.1 Legends and inscriptions

5.1.1 The following legends are durably and legibly marked on a label located on the Weighing Module (Figure 7):

- ‘CE’ marking
- Supplementary metrology marking
- Notified Body verification mark
- Accuracy class
- Serial number
- Designation
- Manufacturers mark or name
- Certificate number
- Power supply
- Pressure range
- Temperature range

6 LOCATION OF SEALS AND VERIFICATION MARKS

6.1 The CE mark shall be impossible to remove without damaging it. The rating plate is secured by a tamper-evident label.

The markings and inscriptions shall fulfil the requirements of Paragraph 9 of Annex I of the Directive 2004/22/EC.

6.2 Each time the “calibration counter” changes, the updated number must be written on a tamper-evident label located on or near the rating plate.

6.3 Sealing measures

The rating plate is secured by a tamper-evident sticker, as shown in Figure 7.

The Weighing module is secured by a tamper-evident sticker, as shown in Figure 8.

The pressure transducers are secured by writing their serial numbers on a tamper-evident label, itself secured by a tamper-evident sticker, as shown in Figure 9.

The tamper-evident stickers shall bear a securing mark. The securing mark may be either:

- a mark of the manufacturer and/or manufacturer's representative, or
- an official mark of a verification officer.

7 ALTERNATIVES

7.1 Having the instrument fitted to a single acting hydraulic ram i.e. fork lift truck, or other single acting loader, provided no back pressure can occur. The second pressure sensor is not connected.

7.2 Having the instrument fitted to a Telescopic loader with a boom extension sensor.

7.3 Having the instrument set-up with up to 10 different attachments (bucket, grabs, tines, etc). The attachment identification is displayed at the top of the display. Each attachment is calibrated independently, with the calibration factors recalled when the attachment is selected.

7.4 Having the instrument operating with “kick out” relay automatically stopping the loading arm at the reference point during the lifting cycle.

7.5 Having the instrument fitted with up to 4 pressure sensors.

8 ILLUSTRATIONS

Figure 1	Typical installation
Figure 2	System overview
Figure 3	Head unit example
Figure 4	Display with legally relevant information
Figure 5	Calibration counter
Figure 6	Software information
Figure 7	Rating plate example and seal
Figure 8	Weighing module sealing method
Figure 9	Pressure transducers sealing method

CERTIFICATE HISTORY

ISSUE NO.	DATE	DESCRIPTION
UK/0126/0176	19 September 2014	Type examination certificate first issued.
-	-	No revisions have been issued.

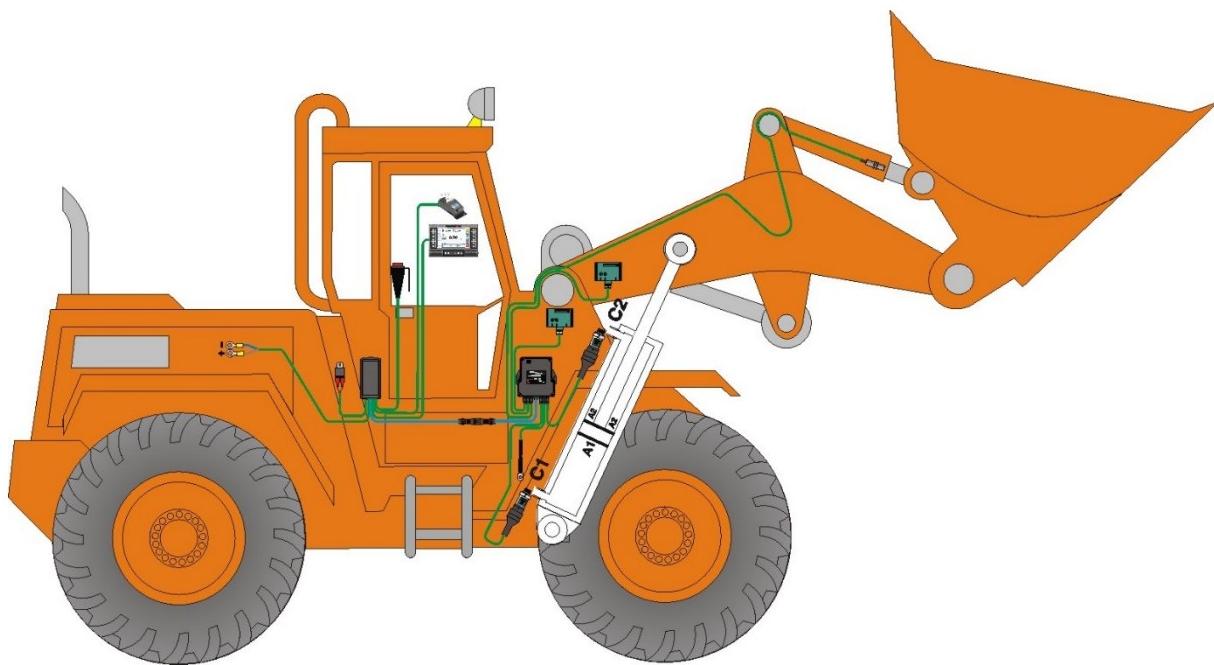


Figure 1 Typical installation

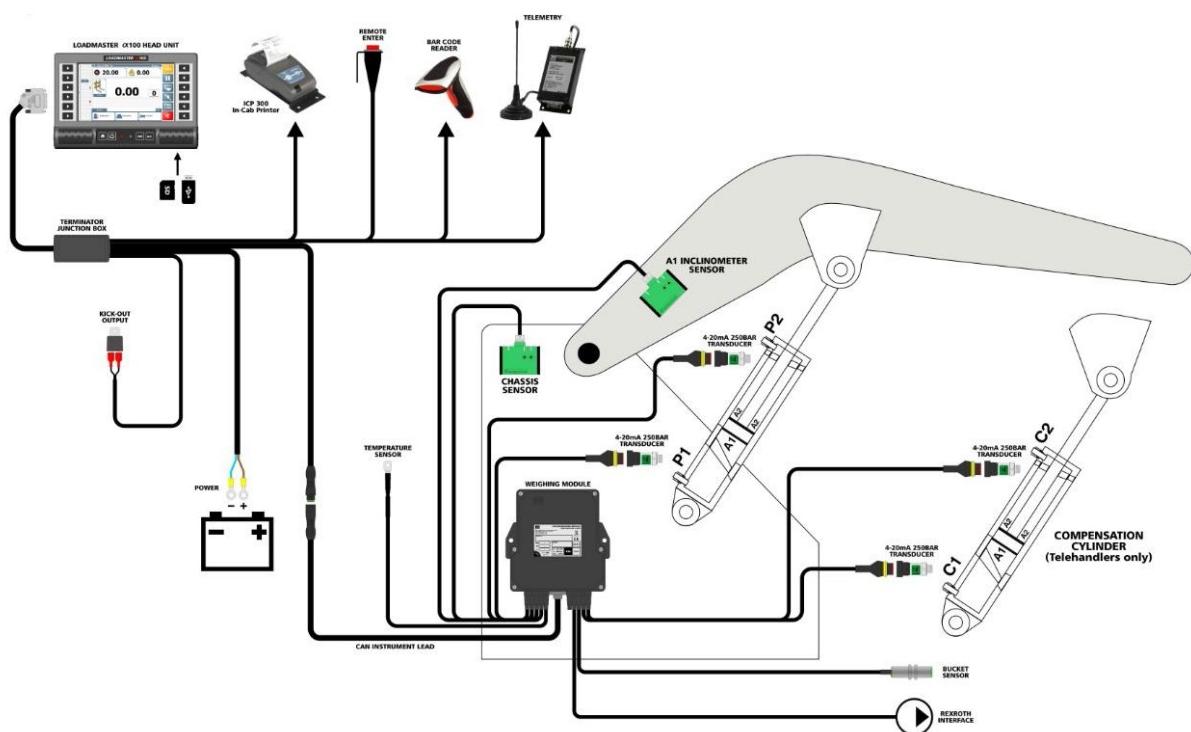


Figure 2 System overview



Figure 3 Head unit example

Basic functions only



All functions enabled



Up to 8 Information Stores : e.g. Product, Customer, Truck, Haulier, Location, Destination, Notes, Mix (Mixture of more than one product), and also Chassis Angle (see below).

Figure 4 Display with legally relevant information

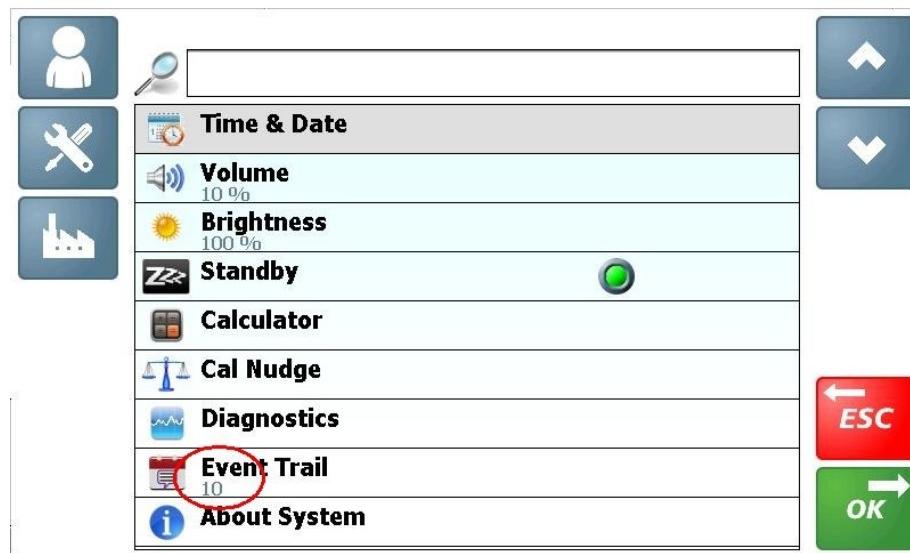


Figure 5 Calibration counter

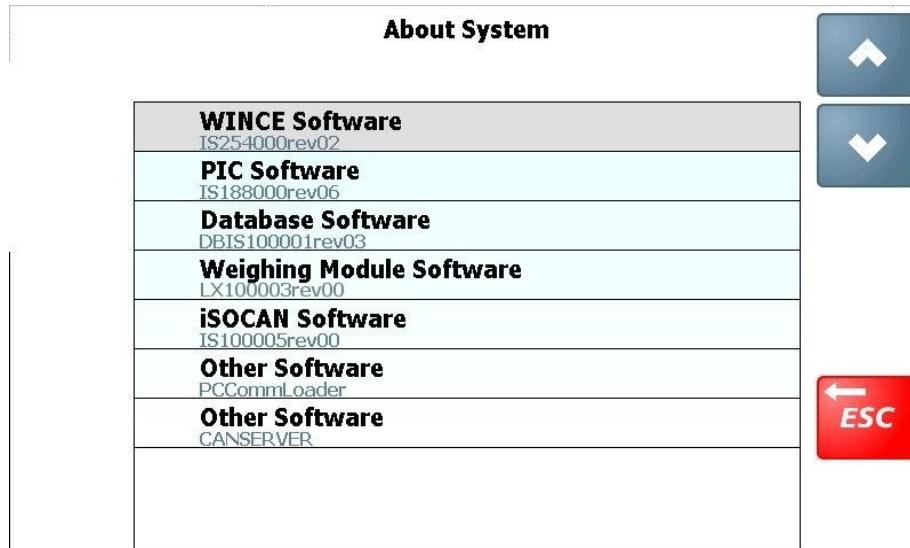


Figure 6 Software information

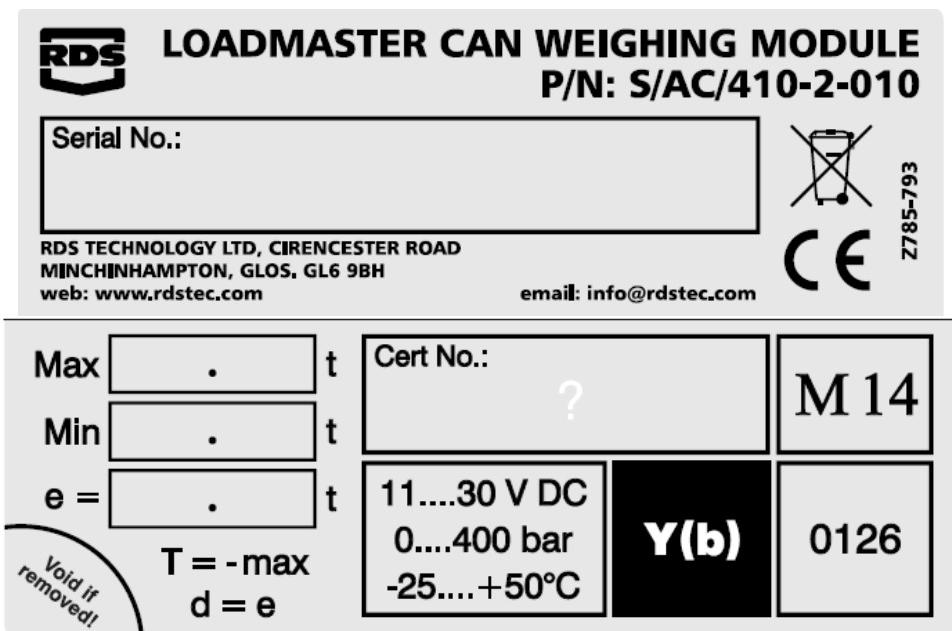


Figure 7 Rating plate example and seal



Figure 8 Weighing module sealing method

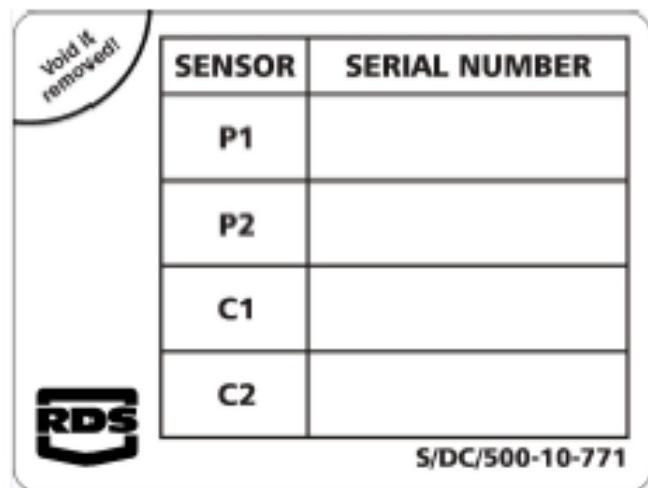


Figure 9 Pressure transducers sealing method